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Ruptured hepatic abscess mimicking perforated viscus

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KEYWORDS
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Peritonitis;
Chilaiditi's syndrome

Summary
Background: In the majority of pneumoperitoneum cases we diagnose perforated viscus. We present herein a case of ruptured hepatic abscess mimicking perforated viscus.
Case report: A 40-year-old man presented to the emergency room with fever and right upper quadrant abdominal pain. The fever had been on/off for a period of 1 month. On physical examination, diffuse abdominal pain with rebounding tenderness was noted. Blood tests showed leukocytosis with left shift, hyperglycemia, and elevated liver function tests. A chest X-ray showed a subdiaphragmatic region air-fluid level, indicating a hepatic abscess. Pneumoperitoneum was also seen. Owing to the status of peritonitis, computed tomography (CT) of the abdomen was performed and revealed an air-containing liver abscess in the right lobe of the liver. Perforation of a hollow organ was also suspected because of the pneumoperitoneum. An emergent laparotomy was immediately performed for the suspicion of a hollow organ perforation. No perforation of the hollow viscus was found. The ruptured hepatic abscess was attributed to the pneumoperitoneum. A blood culture grew *Klebsiella pneumoniae* four days later, and the same organism was also found in a surgical specimen culture of the abscess.
Conclusions: For a ruptured hepatic abscess, surgical intervention with draining of the abscess and cleaning of the abdominal cavity are essential to save patient lives.

Introduction

When subdiaphragmatic free air is seen on a chest X-ray film, we usually diagnose perforated hollow viscus. But this diagnosis is not always correct. There are some imitators that look like perforated hollow viscus. We present herein a case of ruptured hepatic abscess mimicking perforated hollow viscus.

Case report

A 40-year-old man presented to the emergency room complaining of right upper quadrant abdominal pain of several hours duration. He had an intermittent fever of 1-month duration but denied vomiting or diarrhea. He was otherwise well except for a history of hypertension. On examination, his

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temperature was 38.1 °C, pulse 85 bpm, respiratory rate 19/min, and blood pressure 151/95 mmHg. He had diffuse abdominal direct and rebound tenderness. His white blood cell count was 7.5×10^9/l (bands 3%, neutrophils 87%, lymphocytes 4%, monocytes 4%), hemoglobin 12.0 g/dl, and platelet count 171×10^9/l. Glucose was 416 mg/dl, C-reactive protein 26 mg/dl, aspartate aminotransferase 112 U/l, potassium 4.9 mEq/l, sodium 133 mEq/l, blood urea nitrogen 33 mg/dl, and creatinine 1.4 mg/dl.

A chest X-ray (Figure 1) showed bilateral subdiaphragmatic air, indicating pneumoperitoneum, in addition to an abnormal subphrenic collection of gas with an obvious air-fluid level. Computed tomography (CT) of the abdomen (Figure 2) revealed a 9.43 cm × 8.24 cm gas-containing abscess in the right lobe of the liver. On the basis of the CT, the patient was diagnosed with a liver abscess and pneumoperitoneum, the latter presumed to be secondary to perforation of a hollow viscus. The hyperglycemia disclosed previously unsuspected diabetes mellitus. Intravenous metronidazole and cefotaxime were immediately started, and an emergency laparotomy was performed. At surgery, 200 ml of turbid pus was drained from the subphrenic and subhepatic spaces. No gastrointestinal perforation was found. We concluded that the pneumoperitoneum resulted from rupture of the hepatic abscess. *K. pneumoniae* was isolated from blood cultures and from culture of the abscess. By hospital day 15, a repeat chest X-ray showed no air-fluid level or subdiaphragmatic air. The patient eventually made a full recovery.

Discussion

The incidence of pyogenic liver abscess ranges from 10 to 20 cases per 100 000 hospital admissions, and the disease is most prevalent in patients aged 50 to 60 years.[1] Rupture of a liver abscess is relatively uncommon, reportedly occurring in 5.4% of cases.[2]

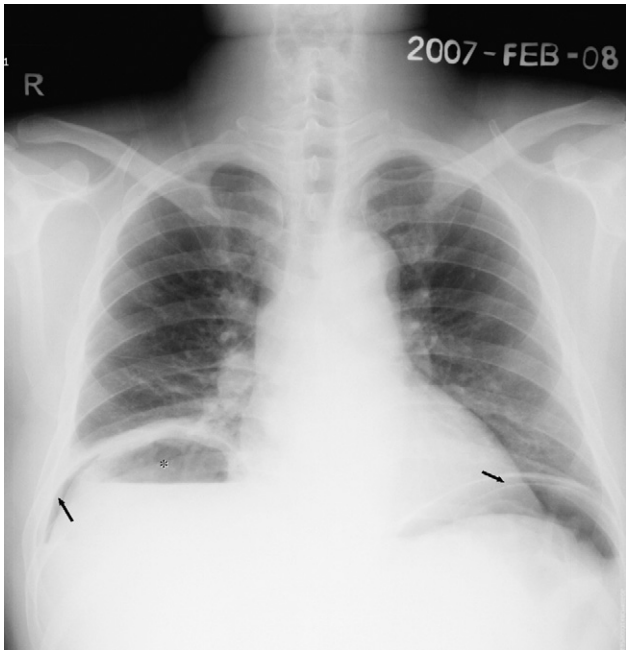

Figure 1 Chest X-ray showing pneumoperitoneum (black arrow) and an abnormal gas collection with an air-fluid level (*) in the right subphrenic region.

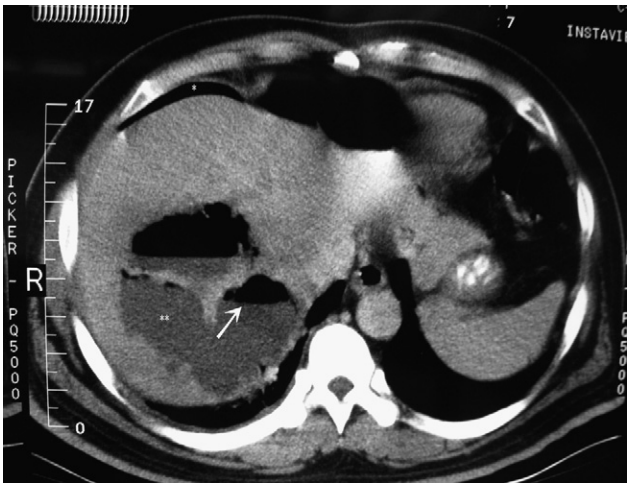

Figure 2 Computed tomography showing a gas-containing liver abscess (**) with an air-fluid level (white arrow) in the right lobe of the liver and pneumoperitoneum (*).

The cause of a hepatic abscess may be difficult to determine, with the infection reported to be cryptogenic in 69% of all cases, commonly in the setting of a comorbid illness such as diabetes mellitus (60.9—68% of cases), cardiopulmonary disease, malignancy, or liver cirrhosis.[2–5] Pyogenic liver abscesses caused by biliary tract disease are usually smaller (less than 5 cm) and more commonly have a positive yield on culture than do cryptogenic abscesses.[5] Infection via the portal route, associated with diverticulitis, pyelophlebitis, appendicitis, and proctitis is another cause. Other possible routes of hepatic microbial invasion include penetrating trauma and hepatic arterial microembolism in patients with sepsis.[1]

The microbiology of pyogenic abscesses depends on the initial source of infection. Commonly isolated pathogens include *Escherichia coli*, *Enterococcus spp,* particularly *Enterococcus faecalis*, viridans streptococci, Bacteroides, and sometimes *Staphylococcus aureus*.[6] *K. pneumoniae* and *E. coli* are the organisms most commonly isolated from abscesses that contain gas and that tend to rupture.

For reasons that are not entirely clear, *K. pneumoniae* is the most commonly isolated pathogen in pyogenic liver abscesses in Taiwan, particularly among patients with diabetes.[7] Metastatic infection is a recognized complication in a small proportion of such cases, including endophthalmitis. Prompt, aggressive evaluation and treatment are indicated if visual symptoms develop in a patient with a Klebsiella liver abscess, but even then the prognosis for visual recovery in Klebsiella endophthalmitis is guarded.[3]

The classic symptoms and signs of a hepatic abscess are fever, jaundice, and right upper quadrant pain. However, some individuals have non-specific symptoms, such as malaise, vomiting, anorexia, fatigue, and weight loss. These more subtle symptoms may lead to a delay in diagnosis.

Pneumoperitoneum is an unusual presentation for a liver abscess and, conversely, liver abscess is rarely the cause of such a finding. Air in the peritoneum is usually attributed to

perforation somewhere in the gastrointestinal tract. Less common sources include other intra-abdominal, gynecologic, or urologic diseases.[6,8–12] On occasion, certain conditions may mimic pneumoperitoneum, including subphrenic abscesses, colonic volvulus, and Chilaiditi's syndrome, where a loop of colon is interposed between the liver and the diaphragm.[13] In our case, no perforation of the gastrointestinal tract was found at laparotomy, and the pus obtained during the procedure grew pure *K. pneumoniae*, indicating that rupture of the abscess accounted for the pneumoperitoneum.

Blood tests are not diagnostic of a liver abscess. Leukocytosis and an elevated alkaline phosphatase are common,[1] and in one series from Taiwan comparing ruptured with unruptured liver abscesses, the levels of bilirubin, aspartate aminotransferase, and blood glucose were all higher in the patients whose abscesses had ruptured.[2] The higher glucose levels reflect the higher prevalence of diabetes among patients with a ruptured abscess caused by Klebsiella. A definitive diagnosis of liver abscess requires imaging, with both sonography and CT being useful. Sonography is operator-dependent and the operator may have difficulty picking out a small, solitary abscess. Its sensitivity is around 79%, compared with 98% for CT,[1] but emergency bedside sonography may be very useful in making a rapid diagnosis. Kim et al. suggested certain CT characteristics suggestive of a Klebsiella abscess, such as a hairball sign or air-fluid level.[14] However, while such imaging distinctions may be sought, culture and sensitivity results are the key to choosing the appropriate antibiotics.

The treatment of choice for an intact hepatic abscess is image-guided needle aspiration and drainage along with parenteral antibiotics. For a ruptured abscess, surgery is essential, not only to drain the abscess but also to clean the contaminated abdominal cavity.[2] The mortality in cases of unruptured hepatic abscess is reported to range from 7.1% to 15.5%, with older age and the presence of biliary disease being adverse prognostic factors. Ruptured liver abscess has a reported mortality of 43.5%.[2,4] As our case illustrates, rapid diagnosis and prompt surgery may indeed be life-saving.

Conclusions

In conclusion, we are aware that not every case of pneumoperitoneum is attributable to a perforated hollow viscus. Additionally, a ruptured hepatic abscess is more life-threatening than an unruptured one. A rapid and accurate diagnosis and prompt surgical intervention are essential.

Conflict of interest: No conflict of interest to declare.

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